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How to Install and Configure 'Collectd' and 'Collectd-Web' to Monitor Server Resources in Linux

Collectd-web is a web front-end monitoring tool based on RRDtool (**R**ound-**R**obin **D**atabase **Tool)**, which interprets and graphical outputs the data collected by the **Collectd** service on Linux systems.

Collectd service comes by default with a huge collection of available plug-ins into its default configuration file, some of them being, by default, already activated once you have installed the software package.

Collectd-web CGI scripts which interprets and generates the graphical html page statistics can be simply executed by the **Apache CGI** gateway with minimal of configurations required on Apache web server side.

However, the graphical web interface with the generated statistics can, also, be executed by the standalone web server offered by **Python CGIHTTPServer** script that comes pre-installed with the main **Git** repository.

This tutorial will cover the installation process of **Collectd** service and **Collectd-web** interface on **RHEL/CentOS/Fedora** and **Ubuntu/Debian** based systems with the minimal configurations needed to be done in order to run the services and to enable a **Collectd** service plug-in.

Please go through the following articles of **collectd** series.

Part 1: **Install and Configure 'Collectd' and 'Collectd-Web' to Monitor Linux Resources**

Part 2: Monitor Linux Resources with Collectd-web and Apache CGI

Part 3: Configure Collectd as a Central Monitoring Server for Clients

Step 1: – Install Collectd Service

1. Basically, the **Collectd** daemon task is to gather and store data statistics on the system that it runs on. The **Collectd** package can be downloaded and installed from the default Debian based distribution repositories by issuing the following command:

On Ubuntu/Debian

```
# apt-get install collectd                    [On Debian based Systems]
```

```
root@server:~# apt-get install collectd
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following extra packages will be installed:
  acl at-spi2-core ca-certificates-java collectd-core colord
  dconf-gsettings-backend dconf-service default-jre-headless fontconfig
  fonts-dejavu fonts-dejavu-extra hicolor-icon-theme java-common libasound2
  libasound2-data libasyncns0 libatk-bridge2.0-0 libatk1.0-0 libatk1.0-data
  libatspi2.0-0 libcairo-gobject2 libcanberra-gtk3-0 libcanberra-gtk3-module
  libcanberra0 libcolord1 libcolorhug1 libdatrie1 libdbi1 libdconf1 libesmtp6
  libflac8 libgd3 libgdk-pixbuf2.0-0 libgdk-pixbuf2.0-common libgphoto2-6
  libgphoto2-l10n libgphoto2-port10 libgraphite2-3 libgtk-3-0 libgtk-3-bin
  libgtk-3-common libgudev-1.0-0 libgusb2 libharfbuzz0b libieee1284-3
  libjasper1 liblcms2-2 libltdl7 liblvm2app2.2 libmemcached10 libmnl0
  libmodbus5 libmysqlclient18 libnotify4 libnspr4 libnss3 libnss3-nssdb
  libogg0 libopenipmi0 liboping0 libpango-1.0-0 libpangocairo-1.0-0
  libpangoft2-1.0-0 libperl5.18 libpq5 libprotobuf-c0 libpulse0 librabbitmq1
  librrd4 libsane libsane-common libsensors4 libsndfile1 libsnmp-base
  libsnmp30 libthai-data libthai0 libtokyocabinet9 libtokyotyrant3
  libupsclient3 libv4l-0 libv4lconvert0 libvarnishapi1 libvirt0 libvorbis0a
  libvorbisenc2 libvorbisfile3 libvpx1 libwayland-client0 libwayland-cursor0
  libxcomposite1 libxcursor1 libxdamage1 libxfixes3 libxi6 libxinerama1
  libxkbcommon0 libxpm4 libxrandr2 libxtst6 libyajl2 mysql-common
  notification-daemon openjdk-7-jre-headless rrdtool sound-theme-freedesktop
  ttf-dejavu ttf-dejavu-core ttf-dejavu-extra tzdata-java x11-common
Suggested packages:
  collectd-dev librrds-perl liburi-perl libhtml-parser-perl
  libregexp-common-perl libconfig-general-perl apcupsd hddtemp ipvsadm
  lm-sensors mbmon memcached mysql-server nginx nut olsrd pdns-server
  postgresql time-daemon default-jre equivs libasound2-plugins
```


Install Collectd on Debian/Ubuntu

On RHEL/CentOS 6.x/5.x

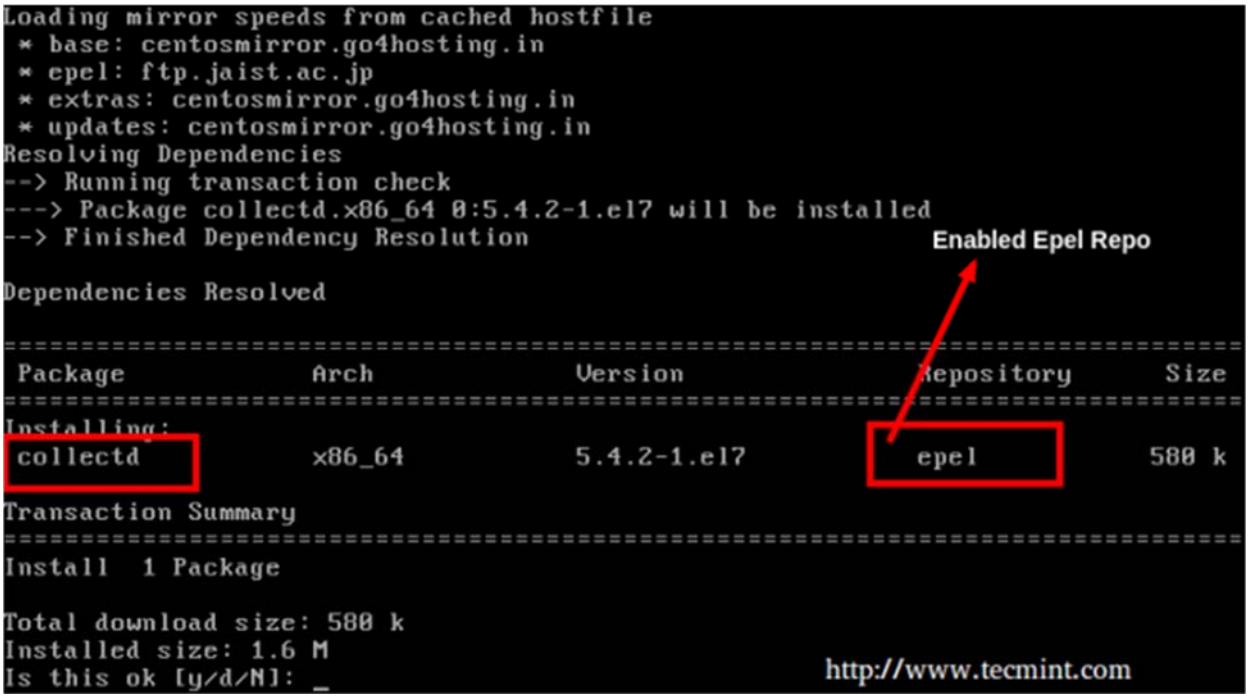
On older **RedHat** based systems like **CentOS/Fedora**, you first need to enable epel repository under your system, then you can able to install **collectd** package from the epel repository.

```
# yum install collectd
```

On RHEL/CentOS 7.x

On latest version of RHEL/CentOS 7.x, you can install and enable epel repository from default yum repos as shown below.

```
# yum install epel-release
# yum install collectd
```



Install Collectd on CentOS/RHEL/Fedora

Note: For Fedora users, no need to enable any third party repositories, simple yum to get the collectd package from default yum repositories.

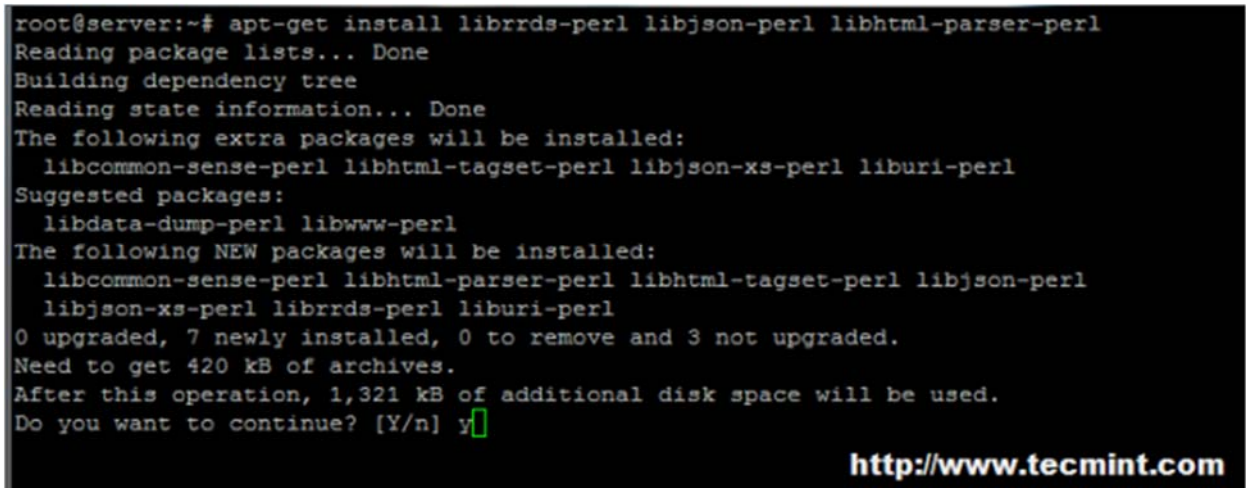
2. Once the package is installed on your system, run the below command in order to start the service.

```
# service collectd start                    [On Debian based Systems]
# service collectd start                  [On RHEL/CentOS 6.x/5.x Systems]
# systemctl start collectd.service        [On RHEL/CentOS 7.x Systems]
```

Step 2: Install Collectd-Web and Dependencies

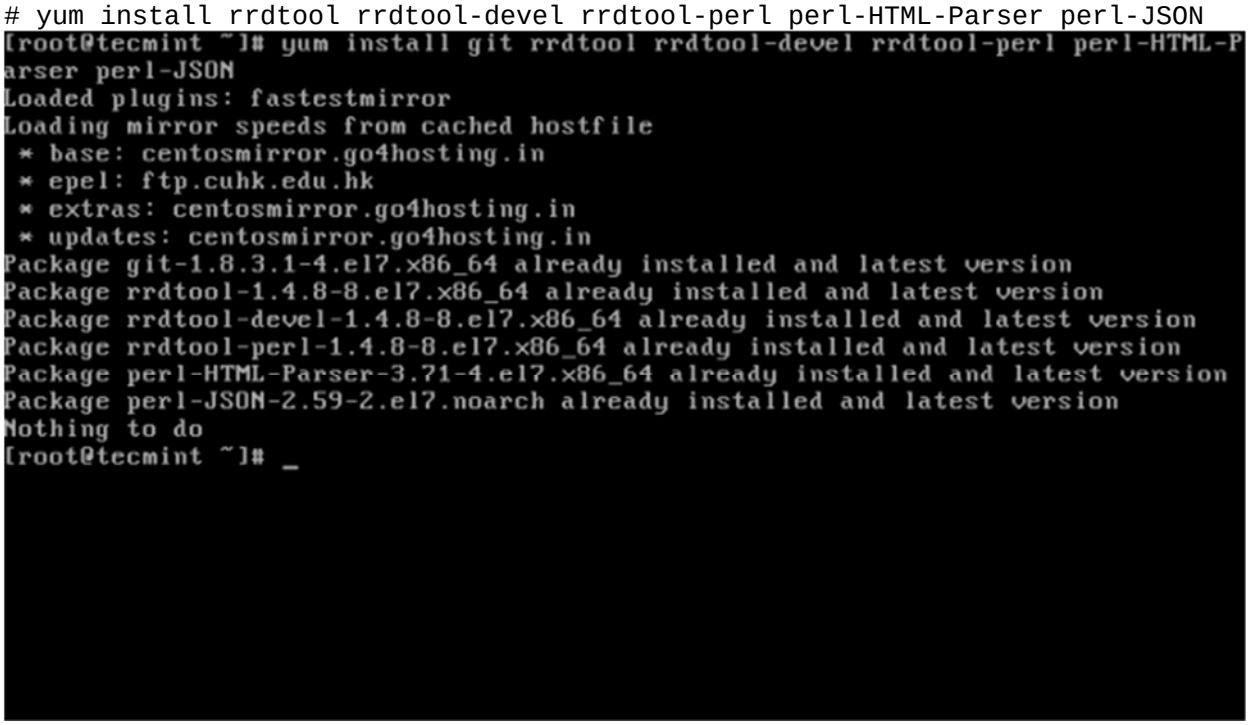
3. Before starting to import the **Collectd-web** Git repository, first you need to assure that **Git** software package and the following required dependencies are installed on your machine:

```
----------------- On Debian / Ubuntu systems -----------------
# apt-get install git
# apt-get install librrds-perl libjson-perl libhtml-parser-perl
```



Install Git on Debian/Ubuntu

```
----------------- On RedHat/CentOS/Fedora based systems -----------------
# yum install git
# yum install rrdtool rrdtool-devel rrdtool-perl perl-HTML-Parser perl-JSON
```

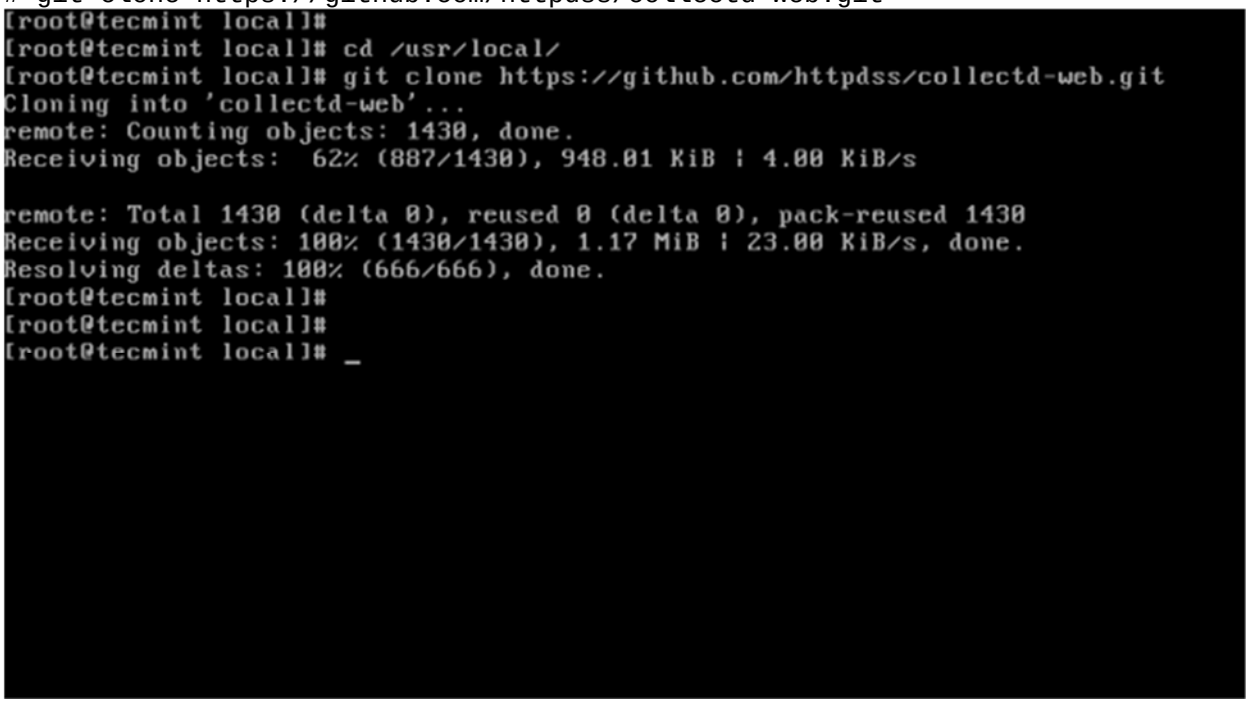


Install Git and Dependencies

Step 3: Import Collectd-Web Git Repository and Modify Standalone Python Server

4. On the next step choose and change the directory to a system path from the Linux tree hierarchy where you want to import the Git project (you can use `/usr/local/` path), then run the following command to clone **Collectd-web** git repository:

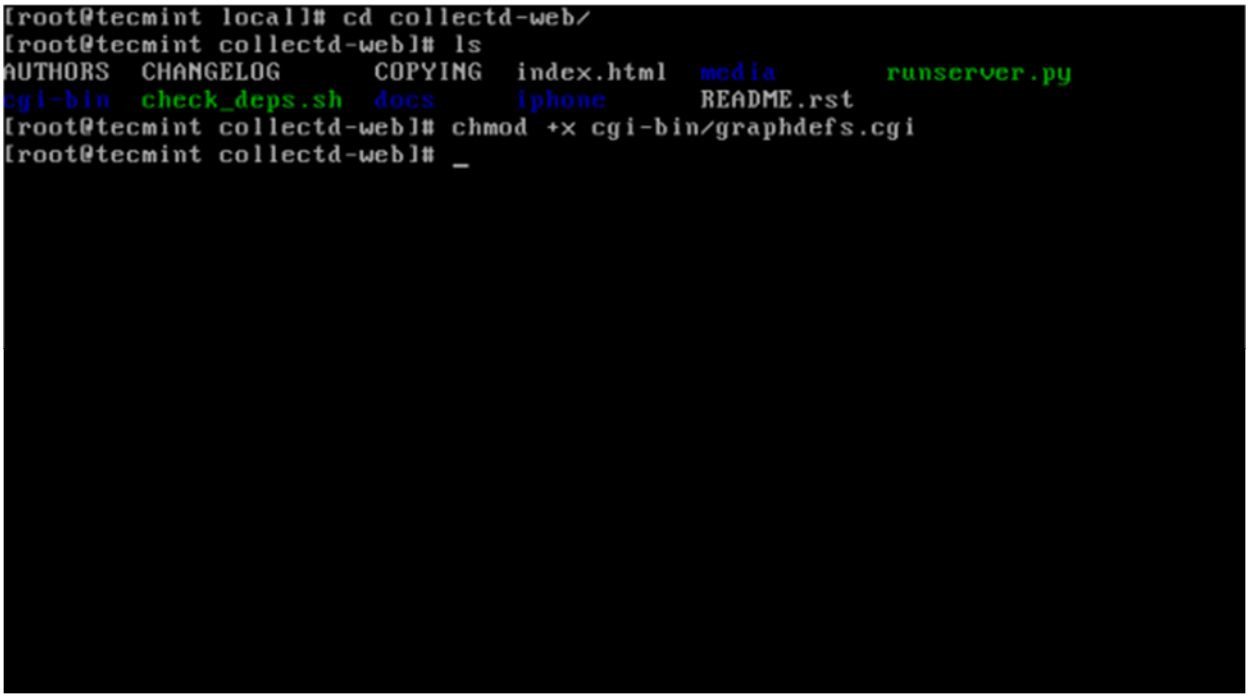
```
# cd /usr/local/
# git clone https://github.com/httpdss/collectd-web.git
```



Git Clone Collectd-Web

5. Once the Git repository is imported into your system, go ahead and enter the **collectd-web** directory and list its contents in order to identify the Python server script (`runserver.py`), which will be modified on the next step. Also, add execution permissions to the following CGI script: `graphdefs.cgi`.

```
# cd collectd-web/
# ls
# chmod +x cgi-bin/graphdefs.cgi
```



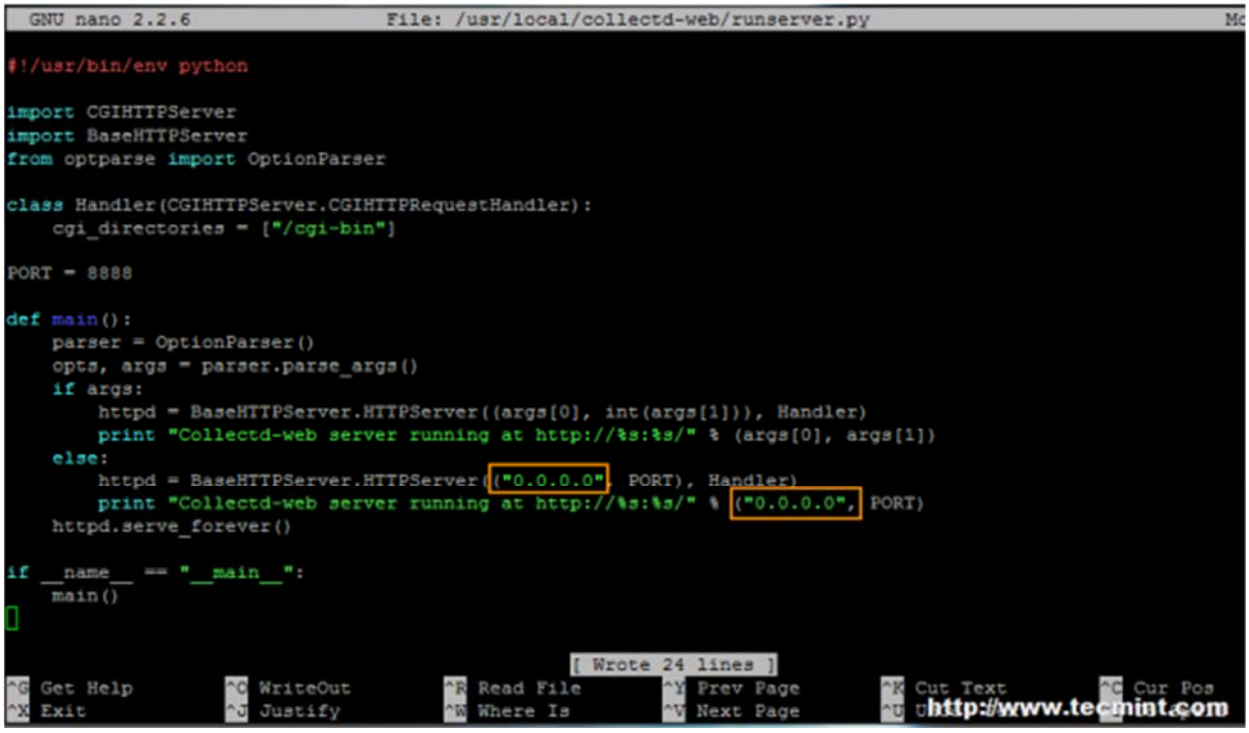
Set Execute Permission

6. Collectd-web standalone Python server script is configured by default to run and bind only on **loopback address (127.0.0.1)**.

In order to access **Collectd-web** interface from a remote browser, you need to edit the `runserver.py` script and change the **127.0.1.1 IP** Address to **0.0.0.0**, in order to bind on all network interfaces IP Addresses.

If you want to bind only on a specific interface, then use that interface IP Address (not advised to use this option in case your network interface Address is dynamically allocated by a DHCP server). Use the below screenshot as an excerpt on how the final `runserver.py` script should look like:

```
# nano runserver.py
```



Configure Collect-web

If you want to use another network port than **8888**, modify the PORT variable value.

Step 4: Run Python CGI Standalone Server and Browse Collectd-web Interface

7. After you have modified the standalone Python server script IP Address binding, go ahead and start the server in background by issuing the following command:

```
# ./runserver.py &
```

Optional, as an alternate method you can call the Python interpreter to start the server:

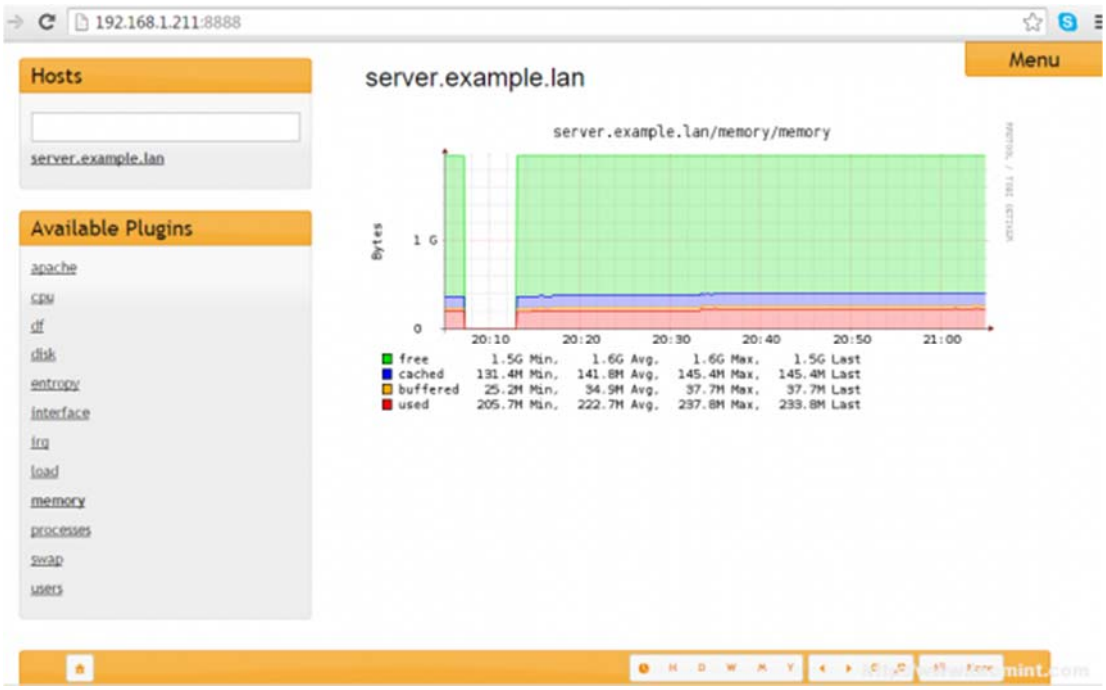
```
# python runserver.py &
```

Start Collect-Web Server

8. To visit **Collectd-web** interface and display statistics about your host, open a browser and point the URL at your server IP Address and port **8888** using HTTP protocol.

By default you will see a number of graphics about CPU, disk usage, network traffic, RAM, processes and other system resources by clicking on the hostname displayed on Hosts form.

```
http://192.168.1.211:8888
```



Access Collect-Web Panel

Linux Disk Monitoring

9. To stop the standalone Python server issue the below command or you may cancel or stop the script by hitting **Ctrl+c** key:

```
# killall python
```

Step 5: Create a Custom Bash Script to Manage the Standalone Python Server

10. To manage the standalone **PyhtonCGIServer** script more easily (**start**, **stop** and view **status**), create the following `collectd-server` Bash script at a system executable path with the following configurations:

```
# nano /usr/local/bin/collectd-server
```

Add the following excerpt to `collectd-server` file.

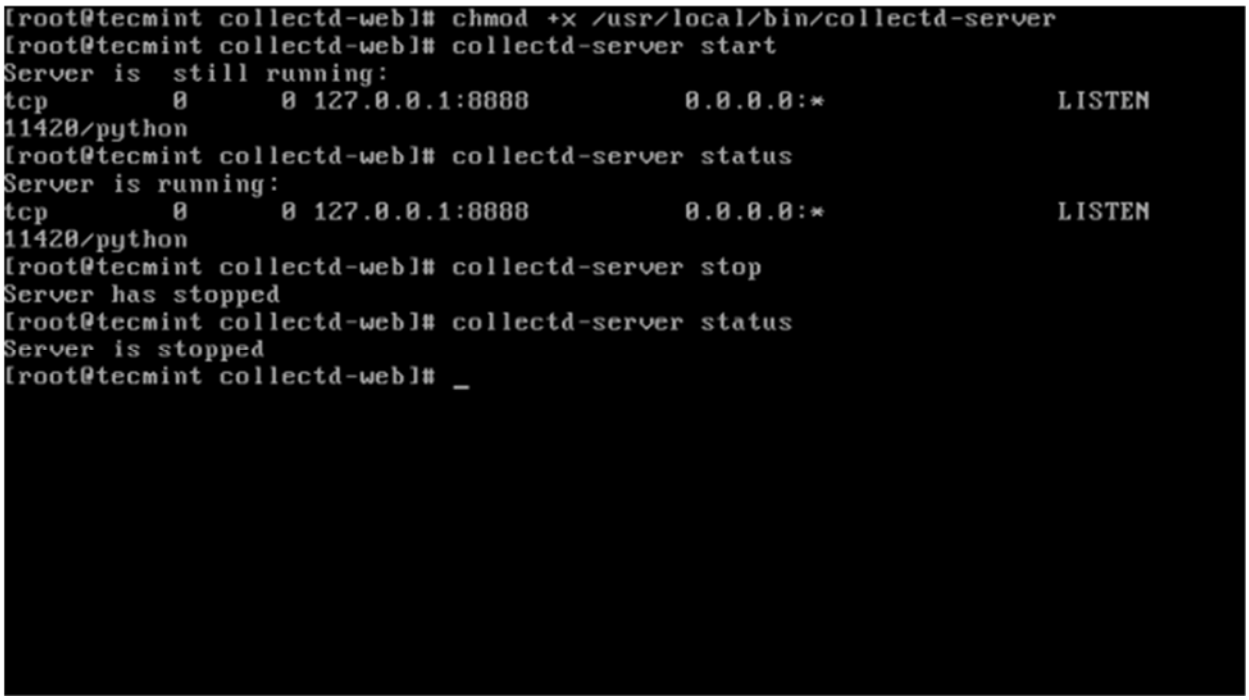
```
#!/bin/bash
PORT="8888"
case $1 in
start)
cd /usr/local/collectd-web/
python runserver.py 2> /tmp/collectd.log &
sleep 1
stat=`netstat -tlpn 2>/dev/null | grep $PORT | grep "python"| cut -d":" -f2
| cut -d" " -f1`
```

```
if [[ $PORT -eq $stat ]]; then
sock=`netstat -tlpn 2>/dev/null | grep $PORT | grep "python"`
echo -e "Server is  still running:\n$sock"
else
echo -e "Server has stopped"
fi
;;
stop)
pid=`ps -x | grep "python runserver.py" | grep -v "color"`
kill -9 $pid 2>/dev/null
stat=`netstat -tlpn 2>/dev/null | grep $PORT | grep "python"| cut -d":" -f2
| cut -d" " -f1`
if [[ $PORT -eq $stat ]]; then
sock=`netstat -tlpn 2>/dev/null | grep $PORT | grep "python"`
echo -e "Server is  still running:\n$sock"
else
echo -e "Server has stopped"
fi
;;
status)
stat=`netstat -tlpn 2>/dev/null |grep $PORT| grep "python" | cut -d":" -f2 |
cut -d" " -f1`
if [[ $PORT -eq $stat ]]; then
sock=`netstat -tlpn 2>/dev/null | grep $PORT | grep "python"`
echo -e "Server is running:\n$sock"
else
echo -e "Server is stopped"
fi
;;
*)
echo "Use $0 start|stop|status"
;;
esac
```

In case you have changed **PORT** variable number from **runserver.py** script, make sure you make the port variable changes on this bash file accordingly.

11. Once you have created the **collectd-server** script, add executing permissions in order to be able to run it. The only thing remaining now is to manage the Collectd-web server in a similar way as you do with a system service by issuing the following commands.

```
# chmod +x /usr/local/bin/collectd-server
# collectd-server start
# collectd-server status
# collectd-server stop
```



Collectd Server Script

Step 6: Enable a Collectd Daemon Plug-in

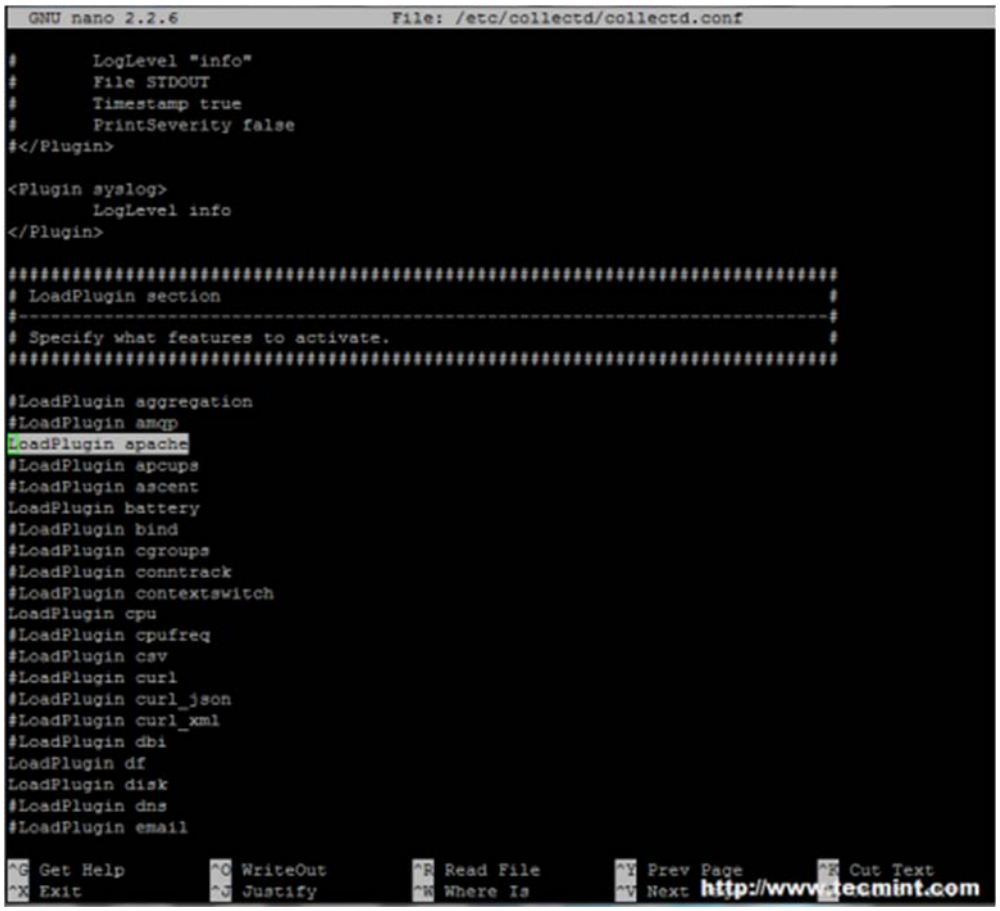
12. In order to activate a plug-in on **Collectd** service, you must go to its main configuration file, which is located at `/etc/collectd/collectd.conf` file, open this file for editing and uncomment, the first time (remove the # sign in front) the plug-in name you want to activate.

Once the **LoadPlugin** statement with the name of the plug-in has been uncommented you must deeply search through the file and locate the same plugin name which holds the configurations required to run.

As an example, here's how you active Collectd **Apache** plugin. First open Collectd main configuration file for editing:

```
# nano /etc/collectd/collectd.conf
```

A. Use **Ctrl+w** to enable **nano editor** search and type **apache** on below terminal the search filed. Once **LoadPlugin** apache statement has been found, remove the comment special sign # to uncomment it, as illustrated in the below screenshot.



Enable Collectd Apache Plugin

B. Next, type **Ctrl+w** to search again, **apache** should already appear on search filed and press **Enter** key to find the plug-in configurations.

Once apache plug-in configurations are located (they look similar to **Apache** web server statements) uncomment the following lines, so that the final configuration should resemble to this:

```
<Plugin apache>
<Instance "example.lan">
URL "http://localhost/server-status?auto"
#               User "www-user"
#               Password "secret"
#               VerifyPeer false
#               VerifyHost false
#               CACert "/etc/ssl/ca.crt"
#               Server "apache"
</Instance>
#
#       <Instance "bar">
#               URL "http://some.domain.tld/status?auto"
#               Host "some.domain.tld"
#               Server "lighttpd"
#       </Instance>
</Plugin>
```

```
 GNU nano 2.2.6                  File: /etc/collectd/collectd.conf

#               StoreRates false
#       </Publish>
#</Plugin>

<Plugin apache>
        <Instance "example.lan">
                URL "http://localhost/server-status?auto"
#               User "www-user"
#               Password "secret"
#               VerifyPeer false
#               VerifyHost false
#               CACert "/etc/ssl/ca.crt"
#               Server "apache"
        </Instance>
#
#       <Instance "bar">
#               URL "http://some.domain.tld/status?auto"
#               Host "some.domain.tld"
#               Server "lighttpd"
#       </Instance>
</Plugin>                                        http://www.tecmint.com
```

Enable Apache Configuration for Collectd

Note: Replace `<Instance "example.lan">` statement string according to your server hostname.

C. After you finish editing the file, save it (**Ctrl+o**) and close it (**Ctrl+x**), then restart **Collectd** daemon to apply changes. Clear your browser cache and reload the page to view the statistics collected by Collectd daemon so far for Apache Web Server.

```
# /usr/local/bin/collectd-server start
```

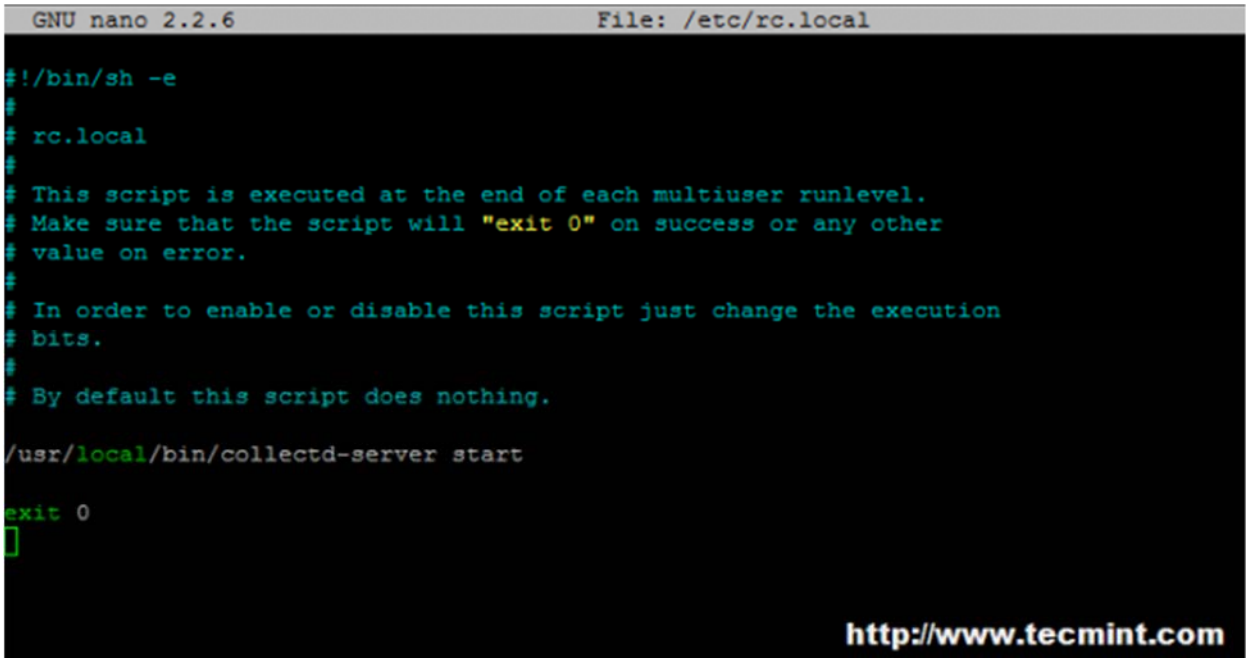
Apache Monitoring

To enable other plug-ins please visit Collectd Wiki page.

Step 7: Enable Collectd Daemon and Collectd-web Server System-Wide

13. In order to automatically start **Collectd-web** server from the Bash script at boot time, open `/etc/rc.local` file for editing and add the following line before the exit **0** statement:

```
/usr/local/bin/collectd-server start
```



Enable Collectd Systemwide

If you're not using the **collectd-server** Bash script which manages the Python server script, replace the above line on **rc.conf** with the following line:

```
# cd /usr/local/collectd-web/ && python runserver.py 2> /tmp/collectd.log &
```

Then, enable both system services by issuing the following commands:

```
------------------ On Debian / Ubuntu ------------------
# update-rc.d collectd enable
# update-rc.d rc.local enable
```

Optionally, an alternate method to enable this services at boot time would be with the help on **sysv-rc-conf** package:

```
------------------ On Debian / Ubuntu ------------------
# sysv-rc-conf collectd on
# sysv-rc-conf rc.local on
------------------ On RHEL/CentOS 6..x/5.x and Fedora 12-19 --------------
# chkconfig collectd on
# chkconfig --level 5 collectd on
------------------ On RHEL/CentOS 7.x and Fedora 20 onwards --------------
```

```
# systemctl enable collectd
```

That's all! **Collectd** daemon and **Collectd-web** server prove to be excellent monitoring tools for Linux servers, with minimal impact concerning system resources, which can generate and display some interesting graphical statistics about machines workload, the only drawback so far being the fact the statistics are not displaying in real time without refreshing the browser.